

**WHAT IS CLAIMED IS:**

1. A vehicle steering system comprising:
  - a steering mechanism including an input section, and a steering section which is mechanically separated from the input section, and arranged to steer a vehicle in accordance with a steering input quantity of the input section;
  - an actuating section to impart an actual torque to the steering mechanism, the actuating section including a plurality of drive units to produce the actual torque; and
  - a controlling section to control the actuating section to achieve a target torque with the drive units, the controlling section including a plurality of control units to control the drive units, respectively, in accordance with a common torque share calculated by one of the control units.
2. The vehicle steering system as claimed in Claim 1, wherein the control units are connected with one another by a communication line, and arranged to exchange information on the common torque share calculated by one of the control units.
3. The vehicle steering system as claimed in Claim 1, wherein each of the control units is configured to select a role between a representative unit for calculating the common torque share and transmitting the common torque share, and a non-representative unit for receiving the common torque share from the representative unit.
4. The vehicle steering system as claimed in Claim 3, wherein each of the control units is configured to detect an operating condition in the unit, to send information on the operating condition through the communication line, and to

determine the role between the representative unit and the non-representative unit, in accordance with the operating conditions of the control units.

- 5     5.     The vehicle steering system as claimed in Claim 4,  
         wherein each of the control units is configured to detect an  
         abnormal state in the unit, to send information on the  
         abnormal state through the communication line, and to  
10     determine the role between the representative unit and the  
         non-representative unit, in accordance with a predetermined  
         order of priority among the control units, excluding one or  
         more control units, if any, which are in the abnormal state.
- 15     6.     The vehicle steering system as claimed in Claim 5,  
         wherein each of the control units, when serving as the  
         representative unit, calculates the common torque share in  
         accordance with the number of control unit or control units  
         which are not in the abnormal state.
- 20     7.     The vehicle steering system as claimed in Claim 6,  
         wherein each of the control units is configured to stop  
         operation of the drive unit assigned to the control unit if the  
         abnormal state is detected in the control unit.
- 25     8.     The vehicle steering system as claimed in Claim 3,  
         wherein each of the control units comprises an operating  
         condition sensor to sense an operating quantity of the steering  
         mechanism, and each control unit, when serving as the  
         representative unit, calculates the common torque share in  
30     accordance with the operating quantity sensed by the operating  
         condition sensor within the control unit.

9. The vehicle steering system as claimed in Claim 8,  
wherein each of the control units is configured to calculate a  
control command quantity in accordance with the operating  
5 condition sensed by the operating condition sensor within the  
control unit and further to calculate the common torque share  
in accordance with the control command quantity when the  
control unit is to serve as the representative unit; and each of  
the control units is configured to calculate the control  
10 command quantity even when the control unit is to serve as  
the non-representative unit.

10. The vehicle steering system as claimed in Claim 9,  
wherein each of the control units is configured to calculate the  
15 control command quantity in accordance with the target torque  
and the operating quantity sensed by the operating quantity  
sensor within the control unit when the control unit is to serve  
as the representative unit; and each of the control units is  
configured to calculate the control command quantity in  
20 accordance with the target torque and the operating quantity  
sensed by the operating quantity sensor of the representative  
unit and sent from the representative unit when the control  
unit is to serve as the non-representative unit.

25 11. The vehicle steering system as claimed in Claim 9,  
wherein each of the control units, when serving as the  
representative unit, determines the common torque share by  
dividing the control command quantity by the number of the  
control units which are not in the abnormal state.

12. The vehicle steering system as claimed in Claim 1, wherein the actuating section is provided for the steering section, and arranged to impart the actual torque to the steering section.

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13. The vehicle steering system as claimed in Claim 1, wherein the input section includes a reaction producing mechanism; and the actuating section is provided for the reaction producing mechanism of the input section, and  
10 arranged to impart the actual torque to the reaction producing mechanism.

14. The vehicle steering system as claimed in Claim 1, wherein the controlling section comprises an upper controller  
15 section to determine the target torque in accordance with a vehicle operating condition.

15. A vehicle steering control process for controlling each of steering torques produced with drive units, to achieve a target  
20 torque in response to a steering input quantity, the vehicle steering control process comprising:

calculating a common torque share when an assigned role is to serve as a representative unit;

receiving the common torque share when the assigned  
25 role is to serve as a non-representative unit; and

controlling at least one of the steering torques in accordance with the common torque share.

16. A vehicle steering control apparatus for controlling an  
30 actual torque for steering a vehicle with a plurality of subsystems to achieve a target torque in response to a driver's

steering input quantity, the vehicle steering control apparatus comprising:

means for selecting one of the subsystems as a representative unit, and leaving the remainder as a non-representative unit;

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means for causing the representative unit to calculate a common torque share in accordance with the target torque;

means for causing the non-representative unit to receive the common torque share from the representative unit; and

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means for producing the actual torque in response to the driver's steering input for steering the vehicle, by causing each unit to produce a torque in accordance with the common torque share.